

EXHIBIT 1

Expert Report of Michael Barber, PhD

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4.1 County Envelope Analysis

Dr. Rodden conducts a county “envelope analysis” to determine if race was a significant factor in the drawing of the 2023 Enacted Congressional map.⁵ In this analysis he investigates the association between the race of registered voters and their propensity to be included in various congressional districts within the county envelope. The method is called an “envelope” analysis because the study is limited to a consideration of voters that live inside of the counties that are either wholly or partially within a particular district of interest. In this way, the counties form the “envelope” from which the district was drawn. Below I offer several critiques of the particular way in which Dr. Rodden conducts this analysis as well as an overall critique of the analysis itself.

Dr. Rodden uses the state list of registered voters (“voter file”) as the data for his analysis. In his report he articulates the reasons for this choice. However, the use of the voter file presents several problems that make it unsuitable for this type of analysis.

First, the voter file, by definition, only contains those individuals who are registered voters. However, when a map drawer creates a map, they must equalize the population of the entire district, regardless of whether or not a person is registered to vote, or is even eligible to register to vote. Thus, if a map drawer were to use the voter file to decide which people to move into or out of a congressional district, they would be, in essence, creating a map that would immediately be invalid due to significant malapportionment issues. It is much more realistic for a map maker to go about the task of drawing congressional districts by assembling census blocks or election precincts using data that contain the entire population rather than a file that only told you the number of registered voters in an area.

A second concern with the use of the voter file is Dr. Rodden’s reliance on the party registration data contained in the file. While North Carolina’s voter file does contain a voter’s registered party, it is often the case that voters who are registered with a party may

⁵Rodden is borrowing a method used by Ansolabehere in a previous racial gerrymandering case as a possible tool to make claims about racial motive in the configuration of the 2023 plan.

not always vote in line with that party registration. This would especially be the case in places in the South where people may have registered with the Democratic party decades ago, but have since realigned to vote primarily for Republicans.⁶ Other instances of party registration being only a noisy signal of actual voting behavior would include people who are not registered with a party at all (approximately 38% of the North Carolina registered voters) but who might still exhibit consistently partisan voting behavior.⁷ Another example of party registration masking voting preferences would include people who register with a party that they do not identify with so as to participate in the primary election knowing that the general election will not be especially competitive. In this way, voters who prefer Republicans but live in especially Democratic areas may register as Democrats so that they can support, in their view, the least objectionable Democrat in the primary who is then likely to win the general election in their district. And likewise, voters who prefer Democrats but live in especially Republican areas may register as Republicans so that they can support the least objectionable Republican who is likely to win the general election in their district. All of these reasons suggest that party registration is often not reflective of actual voting behavior. In my experience as a political scientist and in various redistricting cases, it is much more common to measure the political leanings of a jurisdiction by looking at aggregate vote returns rather than party registration information.⁸

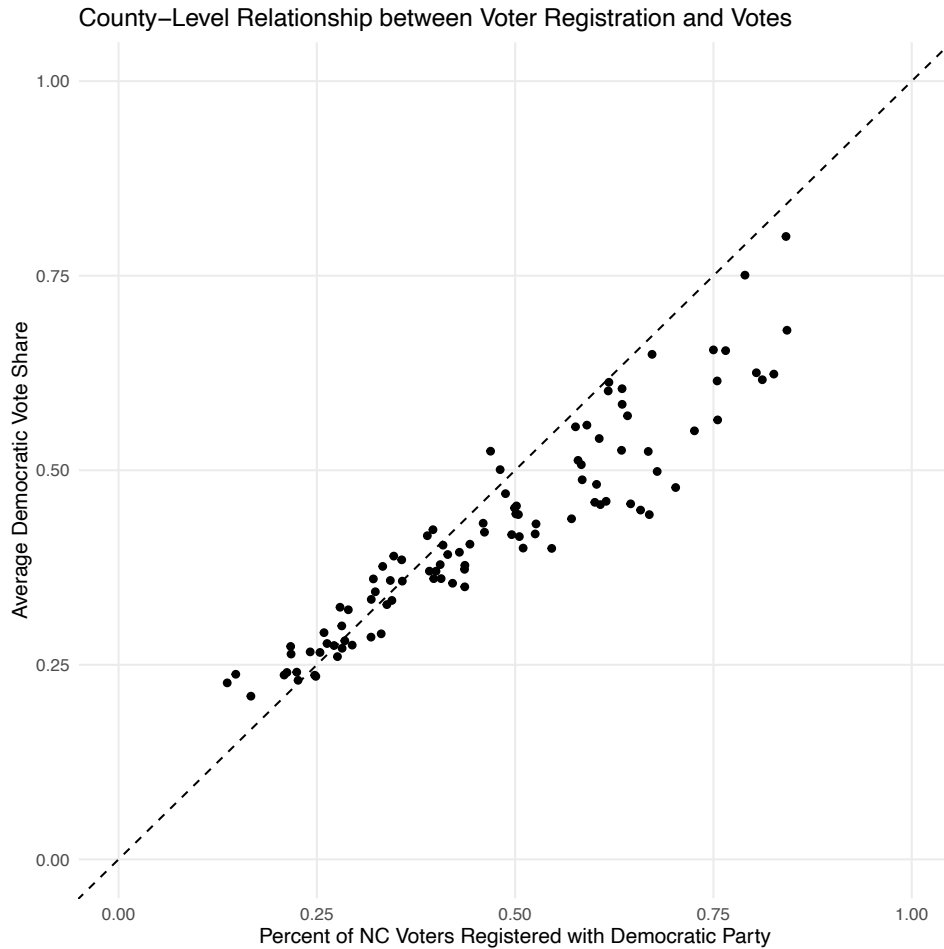
Figure 6 shows that this is the case in North Carolina. In this figure I calculate the percentage of registered voters who are registered with the Democratic party in each county throughout the state. I then also calculate the share of the vote in that precinct that has historically gone to Democratic candidates. If party registration were a perfect reflection of

⁶Hood III, M. V., and Seth C. McKee. *Rural republican realignment in the modern south: The untold story*. Univ of South Carolina Press, 2022.

⁷<https://vt.ncsbe.gov/RegStat/>, Klar, Samara, Yanna Krupnikov, and John Barry Ryan. "Who Are Leaners? How True Independents Differ from the Weakest Partisans and Why It Matters." In *The Forum*, vol. 20, no. 1, pp. 147-159. De Gruyter, 2022.

⁸Levendusky, Matthew S., Jeremy C. Pope, and Simon D. Jackman. "Measuring district-level partisanship with implications for the analysis of US elections." *The Journal of Politics* 70, no. 3 (2008): 736-753. Rogers, Steven. "Electoral accountability for state legislative roll calls and ideological representation." *American Political Science Review* 111, no. 3 (2017): 555-571. Barber, Michael J. "Ideological donors, contribution limits, and the polarization of American legislatures." *The Journal of Politics* 78, no. 1 (2016): 296-310.

Figure 6: Partisan Registration and Vote Shares in NC Counties



Note: Each point shows the share of the county's registered voters who are registered Democrats (horizontal axis), and the share of the county's votes that went to Democratic candidates over the past several years. Democratic registration percents are the 2-party registration rates.

voting behavior, we would see the points fall on, or very close to, the 45-degree line. However, the figure shows that this is not always the case. While there is a strong correlation between the two variables, there are many counties in which vote shares are quite far from party registration numbers. Several counties have a 20 percentage-point gap in the two measures. This is especially true in counties with Democratic voter registration above 50%. Here we see that Democratic vote shares tend to be much lower than party registration numbers. The counties where the deviation between party registration and vote shares are the largest are Bertie, Hyde, Northampton, Robeson, Tyrrell, and Washington Counties. Four of these

six counties are located in Congressional District 1.

This difference between party registration and vote shares shows how a map drawer who went about drawing districts using the voter file, and party registration from the voter file, would often produce districts that are not only malapportioned, but are also not reflective of the partisan balance they may have sought to achieve.

The Supreme Court, in the recent *Alexander* decision noted the difficulty in using individual registered voter records versus the more intuitive approach of looking at census blocks or precincts when considering racial gerrymandering claims. In their decision, the majority stated “This methodology [used by Dr. Liu] was highly unrealistic because it treated each voter as an independent unit that South Carolina could include or exclude from District 1. No map-maker who respects contiguity and compactness could take such an approach...To accurately reflect the district process, an analysis would have to pay attention to whether a voter’s neighbors were moved too.” In my own work as a court-appointed Mapping Special Master in Michigan, I found this statement to accurately reflect my experience. I did not rely on the state voter file at all because it would not have been helpful for creating districts that needed to achieve population balance.

In his report, Dr. Rodden conducts an envelope analysis for 2023 Congressional Districts 1, 6, 12 and 14. Aside from the issue of using the voter file for this analysis, there are other problems that lead to this analysis not offering much insight into the degree to which race was a factor in the creation of the congressional district boundaries. Below I show that when the voter file is replaced with precinct-level analysis that contains the total population, racial demographics, and actual voting behavior of the precinct, many of the results in Dr. Rodden’s analysis either disappear or entirely reverse direction.

To conduct this analysis I take each precinct within the county envelope and note if the precinct is included within the congressional district in question or is excluded. I then conduct a similar regression analysis to Dr. Rodden where the outcome variable is a binary variable for whether or not the precinct was included in the congressional district.

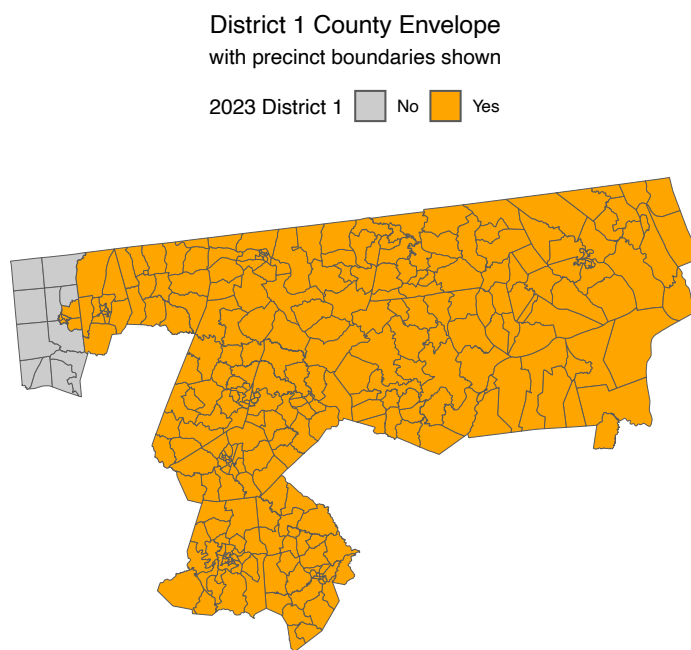
The key independent variables in the regression model are similar to those included by Dr. Rodden: the precinct's Black population percentage, the precinct's Democratic vote percentage (averaged from past statewide elections), a variable indicating if the precinct is located within the district's major city (as identified by Dr. Rodden), and a variable measuring the precinct's distance from the district's geographic center of population. To account for the need to achieve relative population parity, I also include a variable measuring the total population of each precinct.

4.1.1 Congressional District 1

Figure 7 shows the county envelope for Congressional District 1. Precincts included in District 1 are highlighted orange and precincts not included are left in grey. This district poses a significant challenge for any statistical analysis because the district is nearly entirely contained within county boundaries. Therefore, the only precincts that are not included in the district within the envelope are those on the western edge of Granville County. Furthermore, including precincts on the western side of Granville county would violate contiguity without also including connecting precincts on the east side of the county. However, this would then violate population equality. Thus, there is little discretion left with regards to the choice of precincts that are included or excluded from the district within this particular county envelope.

If we nevertheless proceed with the regression analysis, we find that race is not a statistically significant or substantively large predictor of inclusion in the district. Table 1 shows the regression coefficients for this district.

Figure 7: Congressional District 1 County Envelope



Note: Precincts included in the district are highlighted in orange.

Table 1: County Envelope Regression Model - District 1

Variable:	Coefficient	St. Error	p-value
Black Percentage [0-1]	0.201	0.107	0.061
Democratic Percentage [0-1]	-0.223*	0.111	0.046
Total Population (in 1,000s)	-0.020*	0.010	0.035
Distance [miles]	-0.002*	0.001	0.002
Intercept	1.133*	0.046	0.000

Note: Coefficients show the relationship between each independent variable and the dependent variable: precinct inclusion in the district. Coefficients that are statistically significant at the $p < 0.05$ level are indicated with an asterisk.

4.1.2 Congressional District 6

Figure 8 shows the county envelope for Congressional District 6. Precincts included in District 6 are highlighted orange and precincts not included are left in grey. This district is composed of all of Davidson, Davie, and Rowan Counties and portions of Guilford, Forsyth and Cabarrus Counties. Table 2 shows the regression coefficients for this district. In the

regression analysis we find that race is a statistically significant predictor of inclusion in the district, but the results run in the opposite direction of what Dr. Rodden found in this analysis of District 6. In Dr. Rodden’s regression models, race was negatively associated with inclusion in District 6. As he says of his results, “the likelihood of a Black registered voter being included in District 6 is 11 percentage points lower than for registered voters of any other race, even controlling for distance and city residence” (Rodden Report, pg. 13).

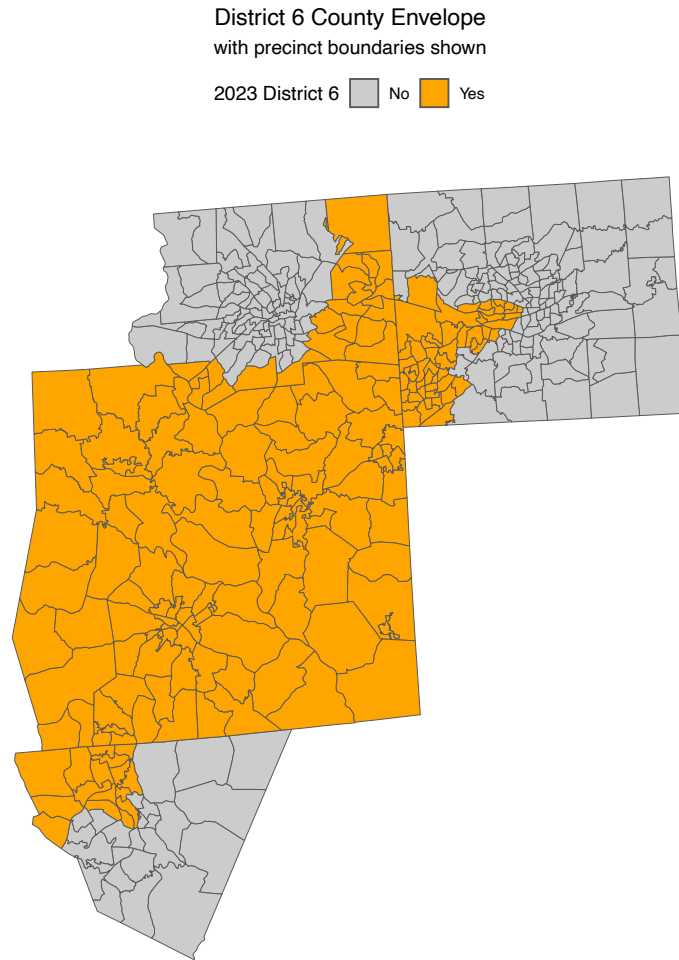
However, in the regression analysis below, precincts with higher Black share of the population are predicted to be *more likely* to be included in District 6, holding the other factors constant. This is shown by the positive and statistically significant coefficient in the table below (0.661*). The conflicting results suggest two things. First, the regression results are highly dependent on which data are used and how the analysis is conducted. This kind of conflicting result suggests that race was not a strong predictor of how District 6 was ultimately drawn. If it were, we would expect to find similar results across a variety of different regression specifications and models. Second, in the regression model below, while the BVAP of the precinct is a statistically significant predictor of precinct inclusion in District 6, it is smaller in absolute magnitude than partisanship, by about half (0.661 versus -1.31).

Table 2: County Envelope Regression Model - District 6

Variable:	Coefficient	St. Error	p-value
Black Percentage [0-1]	0.661*	0.168	0.0001
Democratic Percentage [0-1]	-1.31*	0.165	0.000
Total Population (in 1,000s)	0.036*	0.012	0.003
Distance [miles]	-0.026*	0.002	0.000
Greensboro	0.130*	0.055	0.018
Highpoint	0.558*	0.036	0.000
Intercept	1.395*	0.078	0.000

Note: Coefficients show the relationship between each independent variable and the dependent variable: precinct inclusion in the district. Coefficients that are statistically significant at the $p < 0.05$ level are indicated with an asterisk.

Figure 8: Congressional District 6 County Envelope

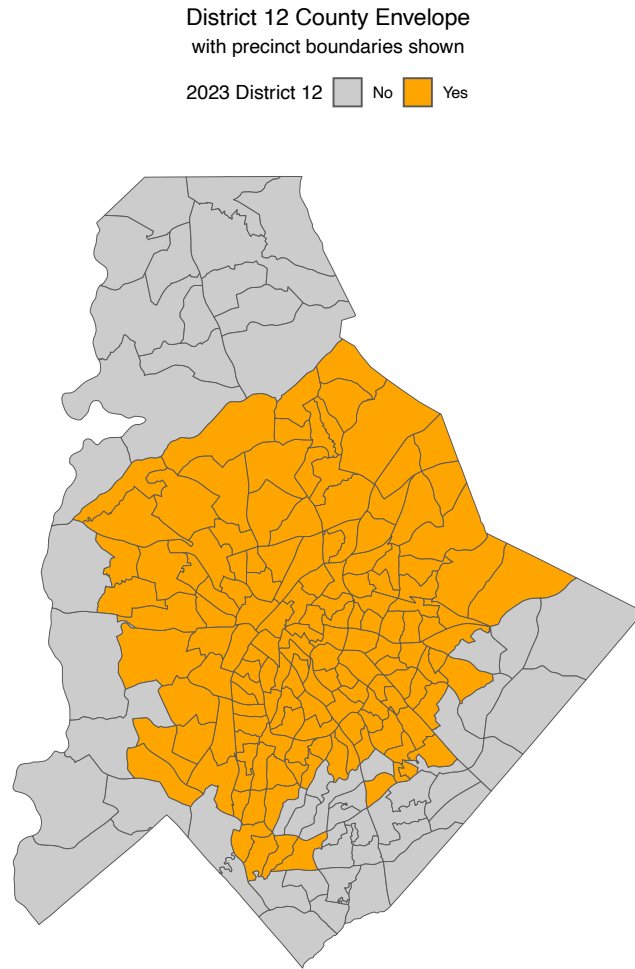


Note: Precincts included in the district are highlighted in orange.

4.1.3 Congressional District 12

Figure 9 shows the county envelope for Congressional District 12. Precincts included in District 12 are highlighted orange and precincts not included are left in grey. This district is composed of portions of Mecklenburg County. In the regression analysis we find that race is not a statistically significant predictor of inclusion in the district. Table 3 shows the regression coefficients for this district.

Figure 9: Congressional District 12 County Envelope



Note: Precincts included in the district are highlighted in orange.

4.1.4 Congressional District 14

Figure 10 shows the county envelope for Congressional District 14. Precincts included in District 14 are highlighted orange and precincts not included are left in grey. This district is composed of all of Burke, Rutherford, Cleveland, and Gaston Counties and portions of Polk and Mecklenburg Counties. Table 4 shows the regression coefficients for this district. In the regression analysis we find that race is a statistically significant predictor of inclusion in the district, but the results run in the opposite direction of what Dr. Rodden found in this

Table 3: County Envelope Regression Model - District 12

Variable:	Coefficient	St. Error	p-value
Black Percentage [0-1]	-0.182	0.168	0.280
Democratic Percentage [0-1]	1.062*	0.309	0.001
Total Population (in 1,000s)	-0.006	0.007	0.406
Distance [miles]	-0.054*	0.008	0.000
Charlotte	0.196*	0.085	0.022
Intercept	0.331	0.190	0.083

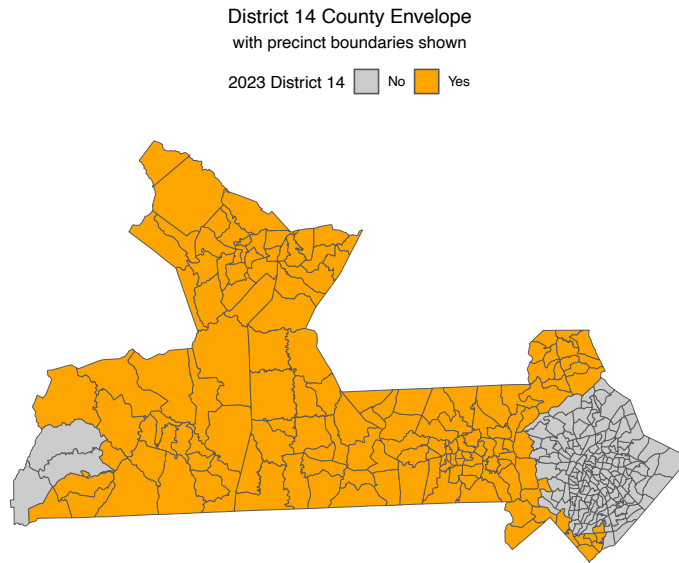
Note: Coefficients show the relationship between each independent variable and the dependent variable: precinct inclusion in the district. Coefficients that are statistically significant at the $p < 0.05$ level are indicated with an asterisk.

analysis of District 14. In Dr. Rodden's regression models, race was negatively associated with inclusion in District 14. As he says of his results, "Black voters were far more likely to be selected for District 12, and not for District 14." (Rodden Report, pg. 23).

However, in the regression analysis below, precincts with higher BVAP are predicted to be *more likely* to be included in District 14, holding the other factors constant. The conflicting results suggest two things. First, the regression results are highly dependent on how the data and analysis are conducted. This kind of conflicting result suggests that race was not a strong predictor of how District 14 or the adjacent District 12 were ultimately drawn. If it were, we would expect to find similar results across a variety of different regression specifications and models. Second, in the regression model below, while the BVAP of the precinct is a statistically significant predictor of inclusion in District 14, it is smaller in absolute magnitude than partisanship, by about three times (0.294 versus -0.887).

The regression analyses show that the results of the envelope analysis are highly dependent on the data and regression specifications used. In many cases the results are either statistically insignificant or run in the opposite direction of the results in Dr. Rodden's report.

Figure 10: Congressional District 14 County Envelope



Note: Precincts included in the district are highlighted in orange.

Table 4: County Envelope Regression Model - District 14

Variable	Coefficient	St. Error	p-value
Black Percentage [0-1]	0.294*	0.116	0.012
Democratic Percentage [0-1]	-0.887*	0.193	0.000
Total Population (in 1,000s)	0.020*	0.007	0.005
Distance [miles]	-0.005*	0.002	0.003
Charlotte	-0.583*	0.069	0.000
Intercept	1.227*	0.062	0.000

Note: Coefficients show the relationship between each independent variable and the dependent variable: precinct inclusion in the district. Coefficients that are statistically significant at the $p < 0.05$ level are indicated with an asterisk.

4.1.5 The County Envelope Method is Unreliable

Another larger issue looms over the envelope analysis in general. One important question is to what degree does a statistically significant coefficient indicate racially-motivated redistricting at all? Race is highly correlated with a number of factors that are essential to the redistricting process. These include not only partisanship, but also geographic location,

population density, historical trends in employment, migration, transportation, and even the type of soil in the area—something that was determined millions of years before humans were ever here.⁹ These factors cannot all be entirely accounted for in a regression model, leading to the question of how often the variable that measures a precinct’s Black voting age population may be capturing something other than racial motivations for inclusion of the precinct in a district that is simply correlated with race. Dr. Rodden states in his report, “If the lines were drawn without respect to race, one would expect the likelihood of inclusion to be roughly similar for White and Black voters” (Rodden Report, pg 11). However, given the correlation between race and many other factors, this statement is not correct.

One way to test whether the envelope method is a good tool to detect possible racial gerrymandering is to look at a set of maps in which the researcher is absolutely certain that race played no role in the drawing of the districts. If we run these same regression models on this set of maps, the number of times that the model flags race as a significant predictor of a district’s shape provides us with a reasonable measure of the degree to which these regression models are producing “false positives,” or statistically significant coefficients for race when race was not in fact considered in the drawing of the district boundaries and is simply correlated with other geographic and population-related factors that did impact the district’s shape. These false positives could arise because of the correlation between race and other factors that are used in redistricting, such as compactness, population equality, and divisions of counties and cities.

To do this, I use a common redistricting algorithm to generate 5,000 congressional district maps that adhere to traditional redistricting criteria of equal population, geographic compactness, avoidance of county divisions, and contiguity.¹⁰ The algorithm is provided no

⁹See: Barber, Michael, and Jeremy C. Pope. “The Crucial Role of Race in Twenty-First Century US Political Realignment.” *Public Opinion Quarterly* 88, no. 1 (2024): 149-160. Rodden, Jonathan A. *Why cities lose: The deep roots of the urban-rural political divide*. Basic Books, 2019. Nall, Clayton. *The road to inequality: how the federal highway program polarized America and undermined cities*. Cambridge University Press, 2018. Acharya, Avidit, Matthew Blackwell, and Maya Sen. *Deep Roots: How slavery still shapes southern politics*. Princeton University Press, 2018.

¹⁰The algorithm is called *redist* and has been used in a number of redistricting-related cases in state and federal court throughout the country, and has been published in a peer reviewed academic journal:

information about race or partisanship as it produces the districts. These algorithms have been used in numerous redistricting cases to provide a comparison set of maps to which an enacted map can be compared on various metrics. Once the algorithm has generate the set of 5,000 maps, I compute the BVAP, partisan lean, and total population of each precinct in each district. I also calculate the county envelope for each district and the population center of each district. I then conduct the same county envelope analysis on each of these districts as was done in the analysis above to see if the BVAP of the precinct was as a statistically significant predictor of whether or not that precinct was included in the district.¹¹

In the cases where race is a statistically significant predictor of precinct inclusion in the district, we know that each and every one of these results is a false positive for racial gerrymandering because we knew from the outset that race played no role in the district's formation. When I conduct this analysis, the most common outcome is 7 of the 14 districts in a map to be flagged as a potential racial gerrymander. These results run contrary to the assertion that if race is not a factor in the drawing of district boundaries then we would expect the likelihood of inclusion in a district to be "roughly similar for White and Black voters" (Rodden Report, pg. 11). If this were the case, then we would expect to see nearly no districts flagged by the envelope analysis as potential racial gerrymanders. However, this is not the case. Figure 11 shows the distribution of outcomes for the 5,000 maps. There were zero maps in which zero districts were identified as a potential racial gerrymander. The fewest number of districts with a statistically significant relationship between precinct BVAP and inclusion in the district was 2, and the greatest number of districts flagged in a map was 13. The most common outcomes were between 6 and 9 districts where race was a statistically significant predictor of precinct inclusion in the district. This is remarkable given the fact that none of these districts were drawn with any racial (or partisan, for that matter)

McCartan, Cory, Christopher T. Kenny, Tyler Simko, George Garcia III, Kevin Wang, Melissa Wu, Shiro Kuriwaki, and Kosuke Imai. "Simulated redistricting plans for the analysis and evaluation of redistricting in the United States." *Scientific Data* 9, no. 1 (2022): 689.

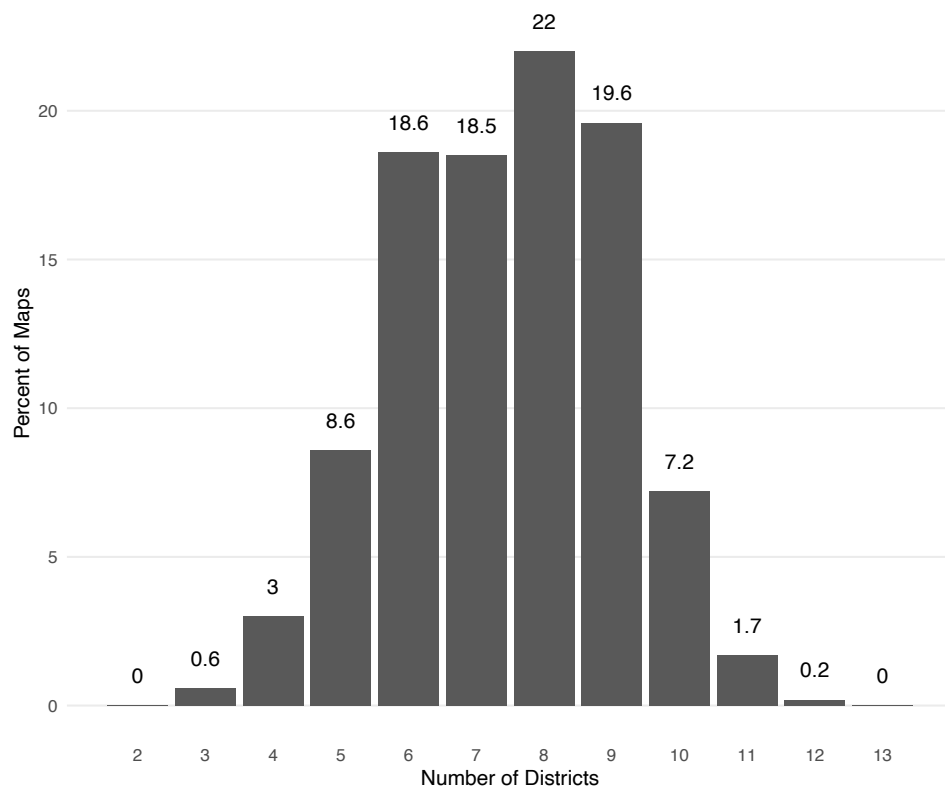
¹¹As in the district specific analysis above, I use the precinct as the unit of analysis and calculate the Black population share of each precinct and the Democratic partisan lean of each precinct.

information. The algorithm was simply attempting to draw equal-population districts that were geographically contiguous and compact that limited split counties.

While Dr. Rodden conducted an envelope analysis on only four districts, if we conduct a similar analysis on all 14 districts in the 2023 Enacted Congressional Map, 8 of them are flagged by the regression models as potential racial gerrymanders where precinct BVAP is a statistically significant predictor of precinct assignment to the district. Doing the exact same procedure on the 2022 court-appointed Special Master Map also yields 8 districts where race is identified as a statistically significant predictor of the district's shape.

These numbers very closely resembles the numbers from the analysis of the 5,000 simulated districts. This close correspondence suggests a number of things. First, the envelope analysis is severely flawed because it produces many "false positives" where race is flagged as a significant predictor of precinct assignment to a district when we know that race played no role in the process. Second, this raises the question of whether the statistically significant results we find in the 2023 Enacted Congressional Map or the 2022 Special Master Congressional Map are also the result of false positives in which the regression model identifies race as a statistically significant predictor of precinct assignment to a district, when the legislature in fact gave no consideration to race at all. Given these concerning results, it is my opinion that the envelope method is not a reliable method for determining if race played a significant role in the assignment of precincts to districts.

Figure 11: Distribution of Districts Identified as Possible Racial Gerrymanders from County Envelope Method Conducted on 5,000 Maps Drawn by Redistricting Algorithm without Any Racial Information



Note: While all 5,000 maps were drawn without racial information and were only instructed to adhere to traditional non-racial and non-partisan redistricting criteria, every map was identified by a county envelope regression analysis as containing numerous districts where race was a statistically significant predictor of the district's shape.

4.2 Core-In-Out Analysis

The second analysis that Dr. Rodden conducts is a “core-in-out” analysis. Here he takes the 2023 Enacted Congressional districts and divides them into three pieces — the “core”, which is the portion of the district that is the same as the corresponding district in the 2022 map; the “in” areas, precincts that are moved into the district that were not a part of the district previously; and the “out” areas, precincts that were included in the previous version of the district but are now no longer included in the district. Regarding this analysis Dr. Rodden states, “If the alterations to the district boundaries are unrelated to race, we would not expect the racial composition of the core of the district to differ dramatically from that of the prior district, and we should expect the composition of the voters moved into a district to be similar, on average, to the composition of the voters moved out of the district” (Rodden Report, pg 15). This statement, however, again fails to consider the fact that race is correlated with all of the factors that are discussed earlier — geography, population density, employment, migration, transportation, etc. If it were the case that districts were assembled by randomly selecting precincts, then the above-referenced statement would be true. However, we know that precincts are not randomly selected even if the map drawer gives no consideration to race. This is because districts must be contiguous, equal in population, and geographically compact (among other factors). These are all factors that are correlated with race.

The second mistake in using this method is that the analysis requires a map to serve as the comparison map by which the new map is overlaid. This is done to determine the “core”, “in”, and “out” precincts in each of the 2023 Congressional districts. Dr. Rodden uses the 2022 Special Master Congressional Map as the comparison map throughout this section of his report. However, it is entirely possible that the legislature gave no consideration at all to the 2022 map when they began drawing the 2023 Enacted Congressional Map. It is possible that they had some other map in mind as the starting point (potentially the 2021 map) or they simply started over with a blank map and had no map in mind as their starting point.

This is important because the map that is chosen as the comparison map will dramatically impact the conclusions that one draws from this analysis.

For example, consider 2023 Congressional District 6. Dr. Rodden concludes that when comparing 2023 CD-6 to 2022 CD-6 that “The percent of self-identified Black voters was larger among those moved out of the district [31.54%] than among those moved into the district [14.66%] by roughly 17 percentage points” (Rodden Report, pg. 15). In other words, those moved out of CD-6 were substantially more Black than those moved into CD-6, when compared to the 2022 version of CD-6. However, if we change the comparator map to be the 2021 Enacted Map that the legislature drew, and was later struck down as a partisan gerrymander, then the results of this analysis dramatically change. In this case, the percent of Black voters is *smaller* among those moved out of the district [14.6%] than among those moved into the district [21.6%] by roughly 7 percentage points. In other words, depending on the comparison map, the results for this district entirely reverse. Figure 12 illustrates this by showing the 2023 CD-6 with the “core”, “in”, and “out” precincts shaded in different colors. The top left map shows these three categories when the 2023 CD-6 is compared to the 2022 CD-6. The top right map shows the three categories when comparing 2023 CD-6 to 2022 CD-10, which is the district that contains the most population overall with 2023 CD-6 of the 2022 districts. The bottom figure shows these categories when comparing 2023 CD-6 to the 2021 version of CD-6. It is immediately apparent that the comparison map can dramatically change the areas of the state included in the analysis and the results that one will obtain.

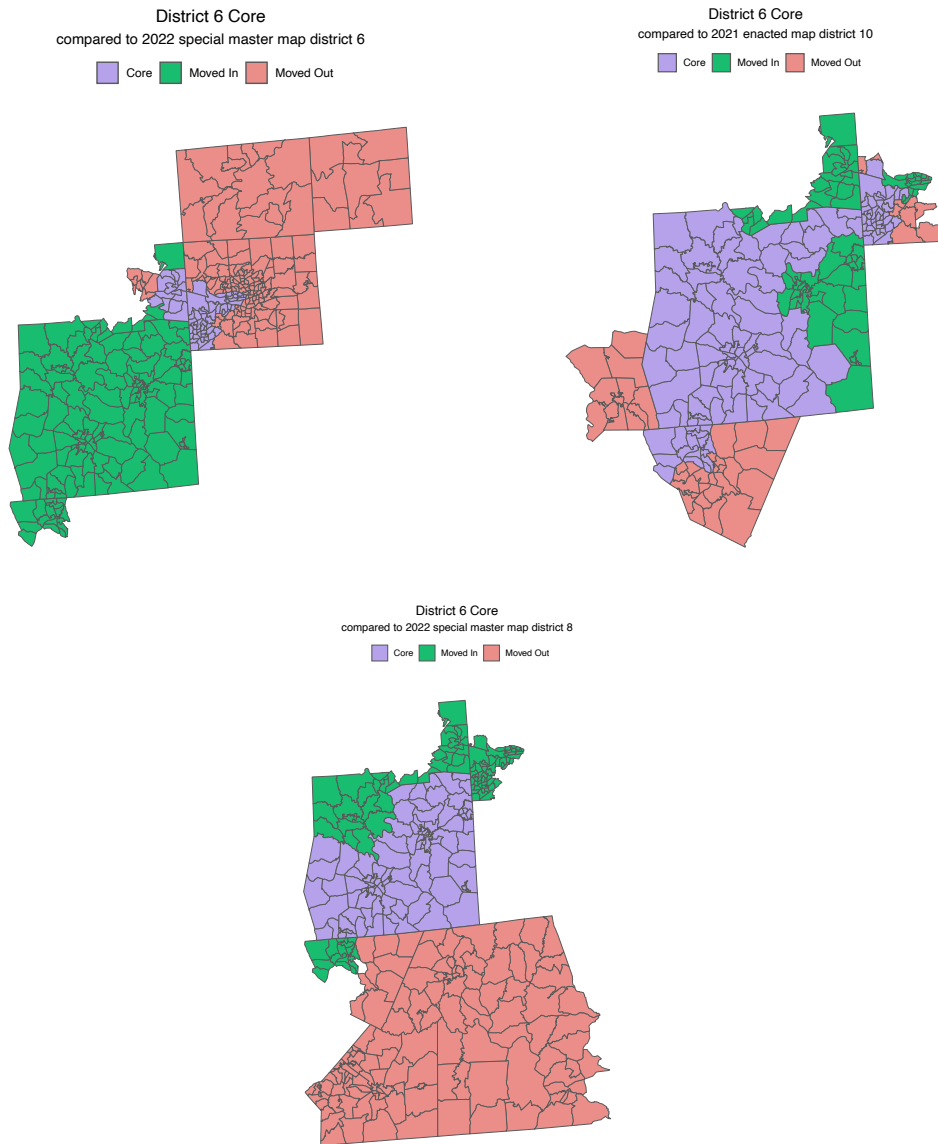
The figure below contains three different maps. The bottom map shows another problem with this analysis. Even if we use the 2022 Congressional map as the comparison map, Dr. Rodden matches districts solely based on their numbering — i.e. 2023 CD-6 is overlaid on to 2022 CD-6 to determine the “core”. However, the numbering of the districts is entirely arbitrary, and in the case of 2023 CD-6, the district that more closely corresponds to this district in the 2022 map is actually 2022 CD-8, as seen in the bottom panel of the figure

below. This has important implications for the conclusions we draw about this district. If we use 2022 CD-8 as the comparison district and complete the same core-in-out analysis in this way, we obtain an entirely different result from what Dr. Rodden finds. In this case, the percent of Black voters is *smaller* among those moved out of the district [16.3%] than among those moved into the district [25.6%] by roughly 9 percentage points. The variety of outcomes shown here illustrates the difficulty of conducting the core-in-out analysis or drawing any conclusions from the results, and it is my opinion that this method does little to shed light on the degree to which race was used in drawing the 2023 Congressional map.

As another example, Dr. Rodden computes the racial breakdown of the core in CD-12 by comparing the 2023 version of CD-12 to the 2022 version of CD-12. He then notes, “[t]he most striking feature of Table 9 is the large Black population selected to form the core of the new district. The Black share of the core [54.49%] is much higher than that of the previous district [36.40%], and much higher than that of the VTDs moved in or out of the district” (Rodden Report, pg. 21). However, CD-12 bears a much stronger resemblance to the 2021 version of CD-12, as seen in Figure 13 below. The right panel, which uses the 2021 map as the comparison, contains a much larger core area than when we compare 2023 CD-12 to the 2022 CD-12 map in the left panel. If we use the 2021 CD-12 as the comparison, then the core of CD-12 is 40.3% Black while 2021 CD-12 was 39.1% Black. This is a much smaller difference than is found when using the 2022 map as the comparison. This again illustrates the problems inherent in this type of analysis.

In CD-14 the results are much the same. Dr. Rodden computes the racial breakdown of the core in CD-14 by comparing the 2023 version of CD-14 to the 2022 version of CD-14. He then notes, “Black voters were a much larger share of those moved out [19.82%] of the district than of those moved into the district [11.62%]” (Rodden Report, pg. 23). However, CD-14 bears a much stronger resemblance to the 2021 version of CD-13, as seen in Figure 14 below. The bottom panel, which uses the 2021 map as the comparison, contains a much larger core area than when we compare 2023 CD-14 to the 2022 CD-14 map in the top panel.

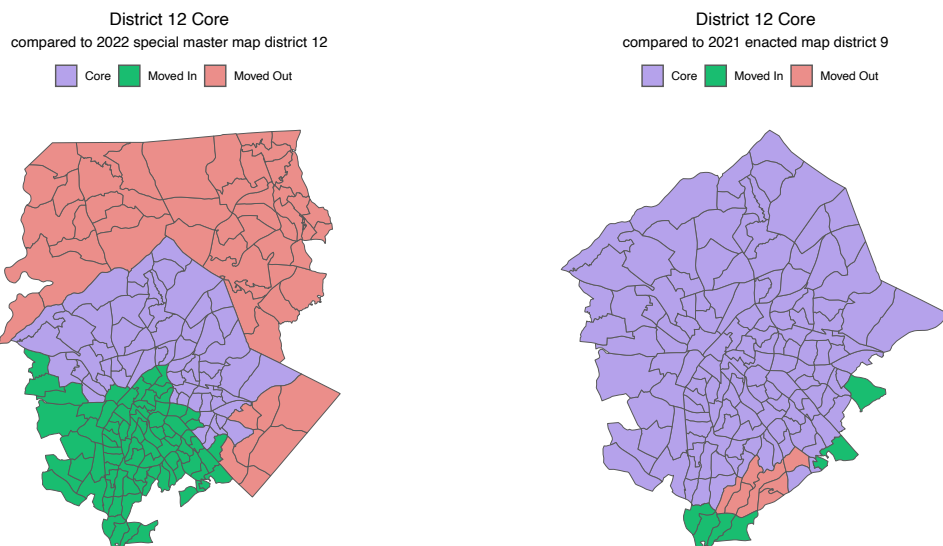
Figure 12: Core, In, and Out precincts for 2023 CD-6



Note: Of the 2022 Congressional Districts, CD-10 contains the most overlap with 2023 CD-6. The bottom figure shows the overlap between 2023 CD-6 and 2021 CD-6.

If we use the 2021 CD-13 as the comparison, then the results are the opposite of what Dr. Rodden finds. The Black percentage of those who are moved out [5.82%] is actually lower than those who were moved into the district [11.7%]. This again illustrates the problems inherent in this type of analysis.

Figure 13: Core, In, and Out precincts for 2023 CD-12



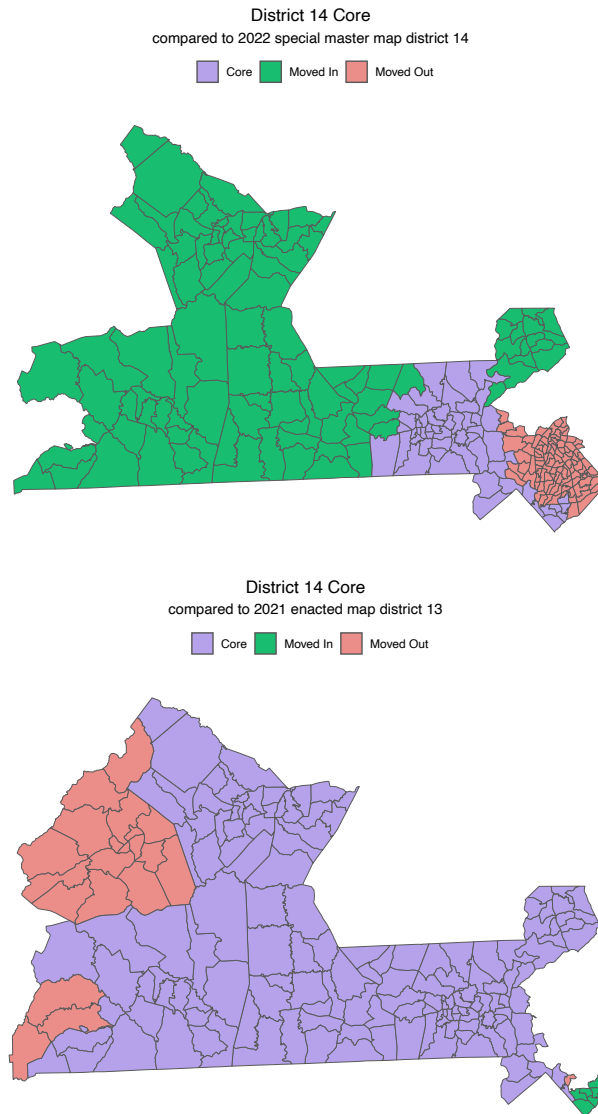
Note: The left figure shows the overlap between 2023 CD-12 and 2022 CD-12. The right panel shows the overlap between 2023 CD-12 and 2021 CD-9.

In CD-1 the results are very similar between the 2023 Map and either the 2022 or 2021 maps. In all three cases, CD-1 (or CD-2 in the 2021 map) is between 40 and 42% Black. Figure 15 shows the overlap between these two districts and the 2023 CD-1 boundaries.

There is no reason that the 2022 map should necessarily be used as the point of reference for looking at the demographic composition of the 2023 Enacted Map. The legislature did not begin the process of drawing the 2023 Map by starting with the 2022 Map.¹² Indeed, when looking at population overlap, the 2021 districts contain greater population overlap with the 2023 districts than any of the 2022 districts (of those considered by Dr. Rodden). The 2022 Map was not a product of the legislature to begin with, as it was drawn by the court-appointed Special Master in 2022. If anything, the 2021 Map bears a much closer resemblance to the 2023 Map and could serve as an equally valid point of comparison when looking at demographic shifts between the two maps. When doing so, many of the

¹²See <https://www.youtube.com/watch?v=4q5ARI8dwpg> for a committee meeting in which Senator Hise explains that the 2022 maps have “expired” and were not used as a starting point for the 2023 map.

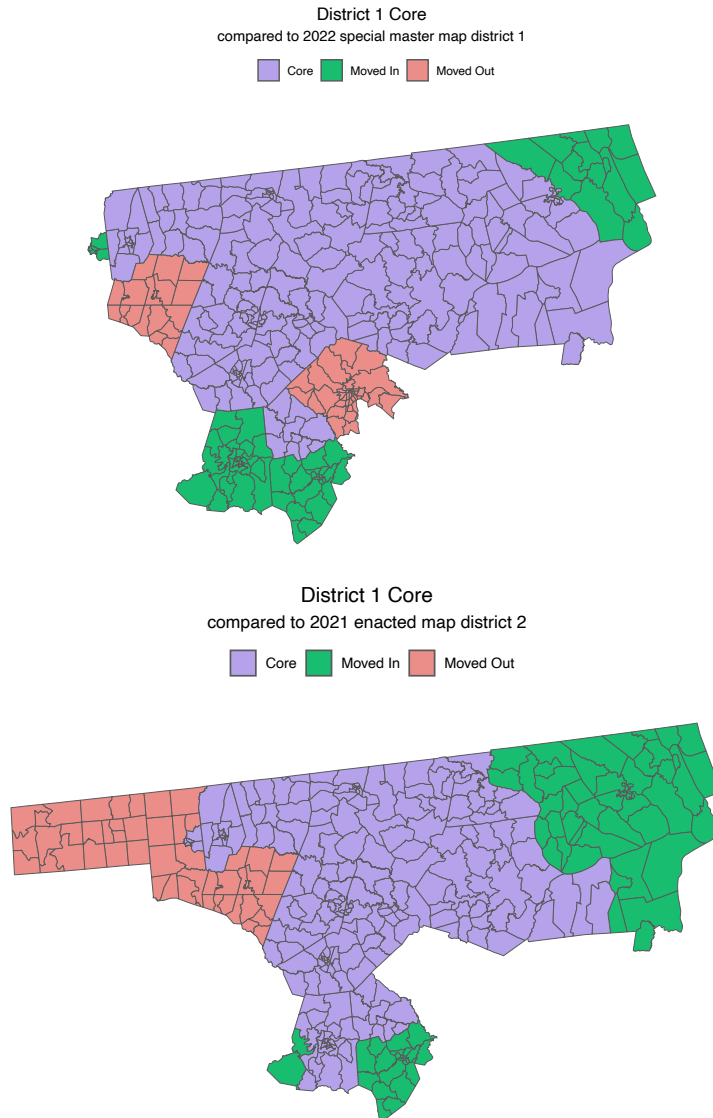
Figure 14: Core, In, and Out precincts for 2023 CD-14



Note: The top figure shows the overlap between 2023 CD-14 and 2022 CD-14. The bottom panel shows the overlap between 2023 CD-12 and 2021 CD-13.

analyses that Dr. Rodden conducts produce entirely different, and in some cases, opposing results. However, it is questionable to use even the 2021 Map as a starting point for these calculations if the legislature started with a truly blank slate when drawing the 2023 Map. In that case, the core-in-out analysis is unsuited for making any conclusions about the racial intent (or lack of intent) of the legislature when drawing the 2023 Congressional map.

Figure 15: Core, In, and Out precincts for 2023 CD-14



Note: The top figure shows the overlap between 2023 CD-1 and 2022 CD-1. The bottom panel shows the overlap between 2023 CD-1 and 2021 CD-2.